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Evaluation of Refraction Skills and Competencies of Ophthalmic Technicians:Providers of Refractive Services in Mozambique

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MOZAMBIQUE EYECARE PROJECT

Evaluation of Refraction Skills and Competencies of Ophthalmic Technicians - providers of refractive services in Mozambique

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Introduction

314 million people worldwide live with low vision and blindness.[1] 145 million people's low vision is due to uncorrected refractive errors (URE). This does not include presbyopia.
Mozambique has an estimated 720,000 people with visual defects (excluding presbyopia).[2] Visual impairment and blindness from URE is estimated at 156,000.[3]
In 2010 Mozambique had 17 ophthalmologists and 60 Ophthalmic Technicians's (OT's) for a population of about 21 million.[4] These are the only personnel in the local health system trained in refraction. In order to meet recommendations from WHO (Vision 2020) for the ratio of eyecare personnel who can refract to head of population, the country would require about 420 refraction competent personnel by 2020.[5]

Aim

This research aims to evaluate knowledge, refraction skills and competencies of OT's. The knowledge and level of refraction skills of the existing OT's is unknown because the location and specifications of their training is varied. By identifying strengths and weaknesses of the OT's refraction knowledge and skills, a programme of mentoring, upskilling and continuing education can be tailored accordingly to further develop their practice and career path.

Methods

16 OT's were evaluated in 4 provinces at the Central Hospitals in Nampula (HCN), Beira (HBC), Chimoio (HCC) and Inhambane (HPI) using a variety of approaches:
i.Background questionnaire to determine OT's levels of training, amount of experience and workload.
ii.Investigative tools for OTs:
a.Questionnaire on perceived confidence in refracting
b.Oral quiz about theoretical knowledge of refraction
c.Observations of OT's in practise (with the equipment available) to grade refraction competencies.

Figure 1: OT's carrying out VA testing and refraction.

Results

Background questionnaire

The OT' s have all trained at different institutions. 7 studied in Cuba on a 3-year training program, 2 in Malawi on a 1-year training program, and 7 in Mozambique. Of those trained in Mozambique, 2 took an 18 month course (graduated 2010), and 5 studied for 2 years.
The refraction component varied in all from theory only (Malawi and Mozambique 18 month course) to three years of theory and practice in Cuba.
Most of the OT's ranged in age from 37 to 49. Their clinical experience averaged at 13 years with a standard deviation (s.d) of 6.5. They refracted an average of 12 patients per day (with a s.d of 5) from an average daily total of 25 patients seen in an eye clinic (with a s.d.of 8).

Confidence skills survey

This was designed to find out how the OT's rated their own skills. Of the 16 OT's:
• None were always confident in performing retinoscopy on spherical or astigmatic eyes
• None were always confident in binocular balancing and +1.00 blur test
• 8 were always confident with performing sphero-cylindrical refraction
• 6 were always confident in determining the power of spectacle lenses through focimetry, and 9 were always confident in determining the power by hand neutralisation (spheres only).

Oral quiz

Subject Areas (n=16)	Pass (%)	Fail (%)
Case History	100	
Refractive Errors	100	
Visual Acuity (VA) and Pupil Distance (PD) Measurements	100	
Retinoscopy	43.75	56.25
Subjective Refraction and Spectacle Prescription	75	25

Figure 2: Table showing results of oral quiz

Refraction skills competency

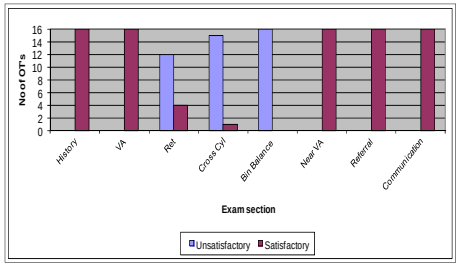

Figure 3: Bar chart showing OT's competencies in performing refractions.

Analysis of results

For accurate refractions OT's need to communicate with patients, have an understanding of refractive errors, and then carry out objective and subjective testing.
The confidence skills survey, oral quiz and observations showed that all OT's were confident in and performed well with patient communication, understanding refractive errors and measuring distance and near VA and correcting presbyopia.
However, the assessments of objective and subjective refraction revealed varying results. This difference can be explained as follows:

a)Refraction training and practical experience

The OT's had different levels of training as shown by the background questionnaire. The OT's trained in Cuba had studied 3 years of refraction theory and practise. They performed best on the oral exam and the confidence levels survey. All 4 OT's who were satisfactory at retinoscopy and the one who was satisfactory at cross-cylindrical refraction were Cuban trained.
The ones who studied in Mozambique on the 18-month course, and in Malawi had only studied theory and had the least experience. They were the 4 that failed the oral exam on subjective refraction and spectacle prescription.

b)Equipment availability and OT capacity to use it

The range of equipment available (see figure 4 below) and the way OT's are taught to use it seems to have a direct relationship to how they performed at certain skills.

Location	VA chart	Trial case & frame	Retinoscope	Auto-refractor	Cross-cyllinder	Lens-meter
HCN	6	5	1	1	0	2
HCB	7	3	2	1	1	1
HCC	4	2	1	1	0	0
HPI	2	2	1	1	0	1

Figure 4: Table of equipment available at various hospitals

Retinoscopes, all new and functioning, were available at all four hospitals but only the Ophthalmologists had access to them. The Cuban trained OT's had been trained to use them and further courses at HCN and HPI resulted in 4 OT's being competent in using them. Lack of access and practise meant the rest were not confident or competent.
The autorefractors were widely used at HCB and HCN but neither has been calibrated and over minus on all prescriptions. The OT's start their subjective testing of spheres and cylinder using this reading. They were not aware of the concept of accommodation and the problems with over-minusing.
Only HCB has a phoroptor with cross-cylinders. Only one OCO corrects astigmatism accurately.
HCB/HCN/HPI have focimeters but the 6 OT's confident with using them only measure spheres.

Recommendations and Conclusions

Refraction is almost half of the OT's daily workload but at present only presbyopes are being corrected with any accuracy. There is huge potential for the OT's to be proficient at refraction.The key recommendations are:
• Training/ Upskilling: The different levels of training of the OT's means that any upskilling will depend on where they qualified. The newly qualified OT's (Mozambique 2010) and the OT's qualified in Malawi need more intensive upskilling as they have no prior knowledge of objective and subjective refraction skills. The ones who qualified from Cuba or have had extra training already have prior knowledge and practice so they will need less time to upskill.
Training should consist of courses in objective refraction in the use of a retinoscope, subjective refraction with cross cylinders for correcting astigmatism and binocular balancing.
Refraction training programs should be standardized in OT courses.
• Equipment provision and training in their use: All OT's should be trained in the use, maintenance and calibration of already available retinoscopes, autorefractors and focimeters. Cross-cylinders need to be sourced for all refraction units.
• Monitoring and Evaluation (M & E) framework for continuing training and education would encourage reflective practice, raise awareness of their knowledge limitations and encourage peer-review thus raising standards of care for their patients.

Figure 5a and b: Assessing the OT's performing retinoscopy

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For further information

Please contact *kajshah@aol.com*. More information on this and related projects can be obtained at *www.mozevecare.ora*.

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